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**MASSACHUSETTS MARINE MONITORING PROGRAM  
NEEDS ASSESSMENT FOR FISCAL YEAR 1998**

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## **MASSACHUSETTS MARINE MONITORING PROGRAM NEEDS ASSESSMENT FOR FISCAL YEAR 1998**

A comprehensive marine monitoring program to gather, assimilate, and disseminate information is a central component of effectively managing coastal resources. Through such a program, better decisions can be made about the management of recreational and commercial fisheries, aquaculture, shellfish beds restoration, and other important coastal resource issues. To evolve into a truly useful tool, however, a marine monitoring program requires a long-term commitment of resources.

For Fiscal Year 1997, the Executive Office of Environmental Affairs (EOEA) received \$200,000 from the state budget to begin to design the Massachusetts Marine Monitoring Program. This program is administered by Massachusetts Coastal Zone Management (MCZM). In this first year, MCZM:

- Developed a Citizen Monitoring Grants Program and distributed over \$45,000 in grants to eleven local monitoring groups.
- Provided \$25,000 to each of three Regional Planning Agencies to continue their technical assistance for local marine monitoring efforts.
- Hired a marine scientist to coordinate the Massachusetts Marine Monitoring Program, who has begun to design the program and plan for its future.
- Deployed a marine monitoring buoy in the lower reaches of the Taunton River to assess the River's impacts on the health of Mount Hope Bay, in conjunction with research efforts sponsored through New England Power.

**To maintain Massachusetts Marine Monitoring Program and current levels, a budget of \$200,000 is required. These funds will be used to continue to:**

- Distribute \$45,000 in grants through the Citizen Monitoring Grants Program.
- Maintain technical assistance efforts initiated by the Massachusetts Bays Program by providing a total of \$75,000 to three Regional Planning Agencies (the Merrimack Valley Planning Council, the Metropolitan Area Planning Council, and the Cape Cod Commission).
- Fund the MCZM Marine Monitoring Coordinator to continue to develop and oversee the Massachusetts Marine Monitoring Program.



In addition, to continue to build the Massachusetts Marine Monitoring Program as a proactive tool for coastal zone management, additional resources for future years are necessary. Specifically, funds are needed for:

- 1) Developing a useful embayment modeling tool.
- 2) Establishing a data management system.
- 3) Performing studies on embayment flushing rates.
- 4) Coordinating the analysis of marine monitoring data.
- 5) Evaluating the pollution entering the coastal environment through rivers.

Each project described below enhances the Massachusetts Marine Monitoring Program in a separate and distinct manner. Ideally, all of these projects can be funded next fiscal year. If budget constraints make this an impossibility, however, these projects can be funded individually. These five projects are listed in order of priority for the Massachusetts Marine Monitoring Program.

### **1) An Embayment Model**

To make the best use of limited resources, MCZM is focusing the Massachusetts Marine Monitoring Program on coastal embayments and estuaries that are impacted by human activities. To achieve this goal, a model must be designed to make information on embayment characteristics readily available to state and federal managers. This modeling tool will use information on the size and shape of the embayment being studied and available data to identify dominant mixing forces (such as tides, winds, and fresh water inputs) that affect the environmental health of the embayment.

This monitoring tool would be flexible and could accommodate both small embayments (such as the Fore River estuary located within Boston Harbor) and large embayments (such as Buzzards Bay). It also could be tailored to address site-specific issues regarding environmental health coastwide. For example, the impact of septic system pollution on Commonwealth coastal waters would be assessed using this modeling tool.

**Budget:** MCZM staff along with the aid of reviewers from the University of Massachusetts, Waquoit Bay National Estuarine Research Reserve, and the Buzzards Bay Project will develop the embayment modeling tool. The project will require **\$50,000** for software development, technical support, and coordination of existing components (nitrogen loading, dissolved oxygen, etc.). Additional funding of **\$50,000** would be required to staff model verification and the implementation of this tool on a subset of embayments in Massachusetts. Once the tool is in place, the more funding that is provided, the greater the number of embayments that can be monitored and the greater the number of coastal management questions that can be answered.

## 2) A Data Management System

Another necessary component of the Massachusetts Marine Monitoring Program is a readily available and easily accessible data management system. To date, there is no comprehensive data management approach in the state that address the needs of marine managers. A comprehensive data management system would forward the necessary information to those making decisions, writing permits, and developing policies. The system would also be "distributed," meaning that it would link available databases from state, federal, local, and academic sources.

The development of a distributed marine database through the Massachusetts marine Monitoring Program would require collaboration and cooperation with the EOE Data center and other EOE agencies.

**Budget:** An estimated \$100,000 would be required to initiate and coordinate this data management effort. The funds would be used to establish a dedicated site and develop a data system accessible through the internet, establish protocols to access state agency data, identify expectations of quality control and assurance for data to be included, identify and provide a source of statistical and graphic software for data analysis and interpretation, and provide user training for distributed system. An additional \$50,000/year over the next 5 years is needed to continue to update, improve, and maintain the data management framework for the marine monitoring program.

## 3) Embayment Flushing Rates

Understanding fate and transport of contaminants within an embayment requires that the physical processes involved be identified. The first step in defining estuarine or embayment transport and fate mechanisms requires that flushing rates to be measured. Flushing rates provide the basis for determining how persistent contaminants are in the water and what the impacts would be on immediate marine resources. A state-wide embayment flushing program would identify estuaries or embayments at risk of contamination.

Historically, flushing rates have been evaluated on a project by project basis in response to specific issues. Such an approach does not allow for the development of a consistent and state-wide database on embayment flushing. A state initiated embayment flushing program ensures consistency and potentially lends itself to more rapid responses by coastal managers. This approach provides a feedback mechanism currently lacking between land-based activities and marine environmental quality. Focussing and highlighting the linkages between land, watershed, and marine management is forward-thinking and promotes the predictive capabilities of modeling tool mentioned above.

**Budget:** A project of this scope would require initial funding of \$200,000. MCZM, with the aid of the Massachusetts Bay Program, the Buzzards Bay Project, the Woods Hole Oceanographic Institution, and U.S. Geological Survey (USGS), would use these funds to



hire a contractor to conduct all field work and calculations of tidal flushing rates. MCZM staff with the aid of the contractor will select a subset from the 100+ embayments in Massachusetts for analysis. Data from this project will be collected and incorporated into the previously mentioned data base structure and ultimately used with the modeling tool.

#### **4) Analysis of Marine Monitoring Data**

Much of the marine monitoring data that is generated today, whether from state and federal agencies or from citizen monitoring efforts, suffer in part from the lack of consistent data collection and analysis procedures. A project designed to promote data consistency will significantly increase Massachusetts' ability to use proactive management strategies and protect valuable coastal habitats and resources. The proposed program will provide additional resources to, and enhance the capabilities of volunteer monitoring groups in the coastal watersheds.

In brief, the program would first develop a network of laboratories based on: 1) compliance specified by EPA methodology or, where such methodologies are lacking, using state-of-art analysis, and 2) cost effectiveness. Once a network of laboratories has been established, MCZM review requests for subsidized analysis from citizen water groups. This project inherently promotes citizen coordination, which in turn promotes access to shared resources (i.e., field sampling equipment) and enhanced information exchange.

**Budget:** This program would initially require funding a **\$75,000** for the identification of participating laboratories, identification of monitoring parameters (nutrients, dissolved oxygen, etc.), and the development of a minimum quality assurance and control protocol for participation for the fiscal year 1998. An additional **\$50,000 per year** would be required to subsidize citizens' water quality analysis.

#### **5) Rivers Monitoring**

Much of the contamination entering coastal waters comes from rivers and streams. Information is currently not available, however, to determine the flow characteristics of these rivers and streams. Consequently, data on the quantity of contamination entering coastal waters from coastal watersheds (the areas that drain into the sea) is not available.


After the flooding event of 1996, the state water resource managers recognized the need for additional flow information on smaller rivers and streams to better serve the citizens of the Commonwealth with accurate predictions and targeted responses to potential flooding emergencies. To assist with this effort, MCZM has targeted the Taunton River and the Taunton watershed for a pilot study.

**Budget:** MCZM staff with the aid of reviewers from the USGS, Massachusetts Emergency Management Agency, the Riverways Program, and the Department of Environmental Management will develop and implement a system to assess the flow of the

major rivers of the Taunton watershed. A minimum of four gauging stations will be needed for the Taunton, Three Mile, Segreganset, and Assonet Rivers. The cost of this program would initially be \$60,000 for the installation, maintenance, and field calibration of flow gauges for the fiscal year 1998. An additional \$20,000 per year would be required for continued flow monitoring.

## **Conclusion**

In Fiscal Year 1997, MCZM made a great start with developing the Massachusetts Marine Monitoring Program. For these monitoring and modeling efforts to have a real effect, however, a long-term commitment of resources is necessary. If the resources listed above can be secured for Fiscal Year 1998, MCZM can take the next giant step in establishing a program that will answer the vital coastal management questions of tomorrow.



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